

FEASIBILITY STUDY

Operational Improvements along US 421
From SR 1226 (Westgate Drive) to the Yadkin River

Wilkes County

Division 11

FS-0811B



Prepared by the
Program Development Branch
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I. General Description

This feasibility study describes the proposed operational improvements along US 421 from SR 1226 (Westgate Drive) to the Yadkin River, a distance of approximately 3.4 miles. The project location is shown on Figure 1. As part of the study, several different cross-sections were investigated, the details of which are as follows:

- ◆ Four-lane divided narrow raised median shoulder section on 200 feet of right of way.
- ◆ Six-lane divided narrow raised median shoulder section on 200 feet of right of way.
- ◆ Four-lane divided shoulder superstreet section on 200 feet of right of way.
- ◆ Six-lane divided superstreet shoulder section on 200 feet of right of way.

This is the initial step in the planning and design process for this project and is not the product of exhaustive environmental or design investigations. The purpose of this study is to describe the proposed project including cost, and to identify potential problems that may require consideration in the planning and design phases.

II. Background

The purpose of this project is to improve the traffic safety and operations along US 421. High Country Rural Planning Organization supports this project.

US 421 is designated as a principal arterial in the North Carolina Statewide Functional Classification System and as a major thoroughfare in the September 1993 Towns of North Wilkesboro and Wilkesboro Thoroughfare Plan. US 421 is also part of the Boone to Winston-Salem Strategic Highway Corridor. On the 2004 Strategic Highway Corridor Vision Plan, US 421 is designated as a freeway facility. US 421 currently is a four-lane divided and five-lane shoulder section with pavement widths varying from 68 feet to 110 feet from edge of pavement to edge of pavement.

The following Transportation Improvement Program (TIP) project is located within the project corridor:

- TIP# R-2207: Upgrade and add climbing lanes to NC 16 from US 421 to Ashe County line.

There are two existing culverts within the project study area. Culvert No. 61 is a double 11' x 9' reinforced concrete box culvert (RCBC), 69 feet wide and 26 feet long which intersects Millers Creek. Culvert No. 61 was built in 1955 and has a sufficiency rating of 79.7 out of 100. Culvert No. 62 is a double 11' x 11' RCBC, 93 feet wide and 33 feet long which intersects Tucker Hole Creek. Culvert No. 62 was built in 1955 and has a sufficiency rating of 82.4 out of 100.

III. Traffic and Safety

There are existing traffic signals located at the following intersections along US 421:

- NC 16/SR 1143 (New Browns Ford Road)
- SR 1323 (Darcy Street)/ Shopping Center Driveway
- Shopping Center Driveway
- SR 1322 (Winkler Mill Road)/(Tyson Road)
- US 421 Business

The current year Average Daily Traffic (ADT) along US 421 is estimated to range from 16,200 vehicles per day (vpd) to 38,100 vpd. For the design year 2035, the traffic volume along US 421 is estimated to range between 27,600 vpd to 65,100 vpd. Truck traffic is estimated to make up approximately 6 percent of the daily traffic.

The existing segment of US 421 operates at a level of service (LOS) D under current traffic volumes. If no improvements are made in the 2035 design year, it is projected that US 421 will operate at a LOS F. With the proposed four-lane improvements, US 421 is projected to operate at a LOS F. With the proposed six-lane improvements, US 421 is projected to operate at a LOS D or better.

Between 2005 and 2008, 181 crashes were reported within the proposed project study area. The crash rate for US 421 is 183.75 crashes per 100 million vehicle miles (crashes/100MVM) traveled. This rate is lower than the statewide rate of 375.75 crashes/100MVM for four-lane undivided with continuous left turn lane urban United States route. There were 55 non-fatal injury crashes, 126 property damage only crashes, and no fatal crashes. The most prevalent types of crashes were Rear End (37%), Angle (26%), Left Turn (12%), and Sideswipe (10%).

IV. Description of Alternatives

It is proposed to widen US 421 from SR 1226 (Westgate Drive) to the Yadkin River, a distance of approximately 3.4 miles. The project location is shown on Figure 1.

ALTERNATIVE 1: Four-lane divided shoulder section, 79 feet from edge of pavement to edge of pavement, with 12-foot travel lanes, a 23-foot raised grass median, and 8-foot shoulders (4 feet of which are paved) on 200 feet of right of way. Included in the costs below are the extensions of Culvert No. 61 at Millers Creek and Culvert No. 62 at Tucker Hole Creek.

With this proposed cross-section, it is anticipated that there will be zero (0) residences and zero (0) businesses relocated due to this project. The total cost of this alternative, including utility relocation, construction, and Intelligent Transportation Systems (ITS) devices, is estimated to be \$19,300,000.

Right-of-way.....	\$0
Utility Relocation.....	\$4,500,000
Construction.....	\$14,400,000
ITS devices.....	\$400,000
Total Cost (Alternative 1).....	\$19,300,000

ALTERNATIVE 2: Six-lane divided shoulder section, 103 feet from edge of pavement to edge of pavement, with 12-foot travel lanes, a 23-foot raised grass median, and 8-foot shoulders (4 feet of which are paved) on 200 feet of right of way. Included in the costs below are the extensions of Culvert No. 61 at Millers Creek and Culvert No. 62 at Tucker Hole Creek.

With this proposed cross-section, it is anticipated that there will be zero (0) residences and zero (0) businesses relocated due to this project. The total cost of this alternative, including utility relocation, construction, and ITS devices, is estimated to be \$26,200,000.

Right-of-way.....	\$0
Utility Relocation.....	\$4,500,000
Construction.....	\$21,300,000
ITS devices.....	\$400,000
Total Cost (Alternative 2).....	\$26,200,000

ALTERNATIVE 3: Four-lane divided superstreet shoulder section, 86 feet from edge of pavement to edge of pavement, with 12-foot travel lanes, a 30-foot raised grass median, and 8-foot shoulders (4 feet of which are paved) on 200 feet of right of way. Included in the costs below are the extensions of Culvert No. 61 at Millers Creek and Culvert No. 62 at Tucker Hole Creek.

With this option, it is anticipated that there will be zero (0) residences and zero (0) businesses relocated due to this project. The total cost of this alternative, including utility relocation, construction, and ITS devices, is estimated to be \$27,200,000.

Right-of-way.....	\$0
Utility Relocation.....	\$4,500,000
Construction.....	\$22,300,000
ITS devices.....	\$400,000
Total Cost (Alternative 3).....	\$27,200,000

ALTERNATIVE 4: Six-lane superstreet shoulder section, 110 feet from edge of pavement to edge of pavement, with 12-foot travel lanes, a 30-foot raised grass median, and 8-foot shoulders (4 feet of which are paved) on 200 feet of right of way. Included in the costs below are the extensions of Culvert No. 61 at Millers Creek and Culvert No. 62 at Tucker Hole Creek.

With this option, it is anticipated that there will be zero (0) residences and zero (0) businesses relocated due to this project. The total cost of this alternative, including utility relocation, construction, and ITS devices, is estimated to be \$34,500,000.

Right-of-way.....	\$0
Utility Relocation.....	\$4,500,000
Construction.....	\$29,600,000
ITS devices.....	\$400,000
Total Cost (Alternative 4).....	\$34,500,000

V. Community Issues

A detailed investigation was not conducted for this feasibility study, however no impacts to schools, parks, recreation areas, or community facilities are anticipated with this project.

Maps at the Survey and Planning Branch of the North Carolina State Historic Preservation Office were used to determine if any historic properties on the National Register of Historic Places (NRHP) or state study lists exist within the proposed project corridor. No properties within the project study area were found to be potentially historic properties.

VI. Natural Environment Issues

The following is a preliminary review of environmental issues that might have a potential impact to the project. The information obtained for the environmental screening is from a Geographic Information System (GIS) database. The purpose of the environmental screening is to identify potential environmental issues early in the process.

Stream Classification

The proposed project study area is located in the Yadkin-Pee Dee River Basin. US 421 crosses several water bodies in the project corridor. Millers Creek has a stream classification of WS-IV. The Yadkin River and Tucker Hole Creek have a stream classification of WS-IV Tr Ca. These water bodies will likely need to be surveyed and have the appropriate coordination with the North Carolina Department of Environment and Natural Resources (NCDENR) and the U.S. Army Corps of Engineers (USACE) during any environmental document study. A portion of the project study area is located in WS-IV watershed.

Wetlands

US 421 crosses wetlands associated with Millers Creek, Tucker Hole Creek, and the Yadkin River. Permitting with the U.S. Army Corps of Engineers (USACE) will likely need to be obtained before construction of the project, and appropriate mitigation measures should be taken if deemed necessary. A portion of the project study area is located in a 100 and 500-year floodplains.

Threatened and Endangered Species

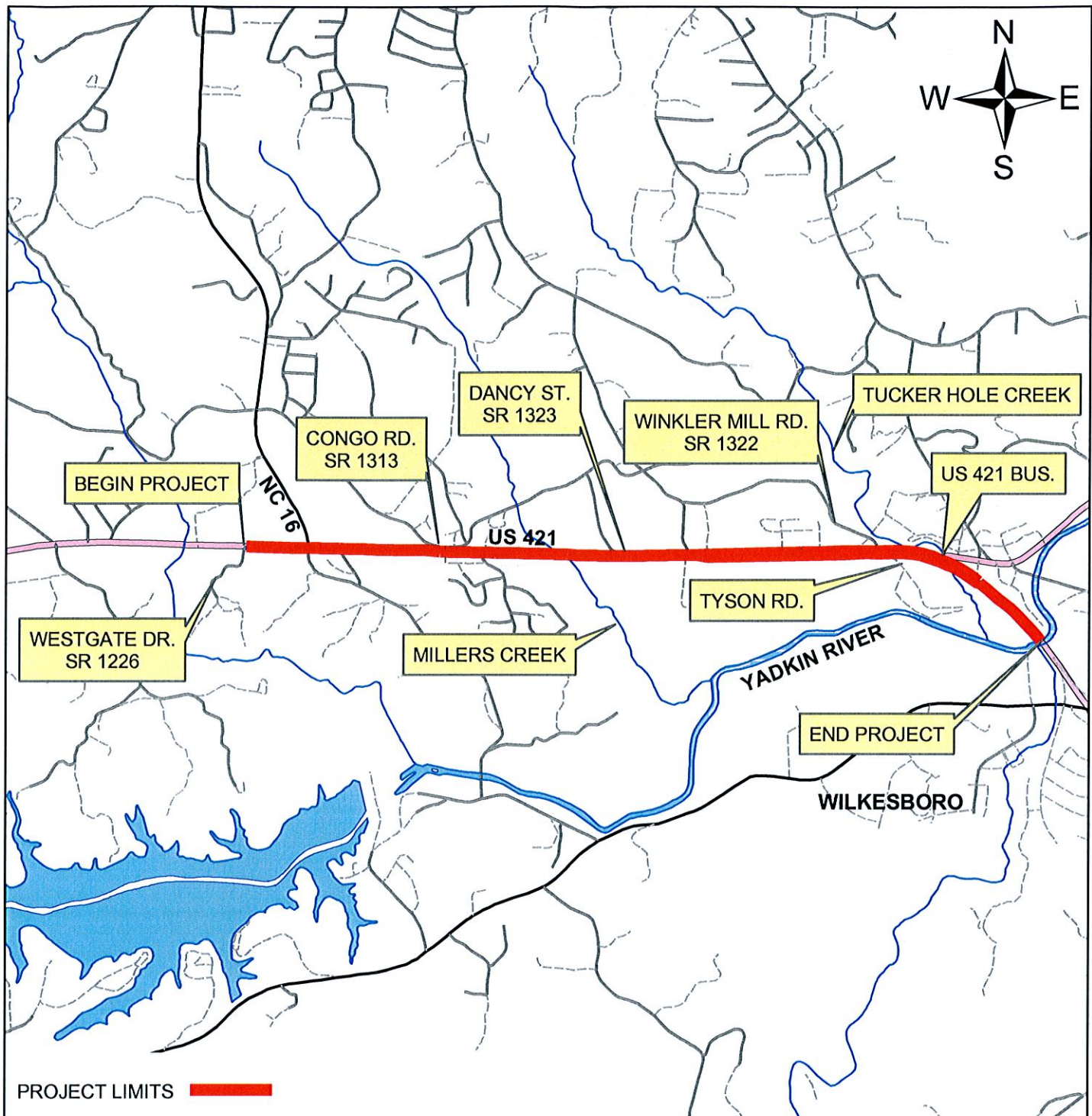
A trout stream was identified within the project study area.

VII. Recommendations

ALTERNATIVES 1 & 3: It was found that the four-lane divided shoulder section and the four-lane divided superstreet shoulder section would not be able to accommodate the projected 2035 design year traffic volumes.

ALTERNATIVES 2 & 4: It was found that the six-lane divided shoulder section and the six-lane superstreet shoulder section would be able to accommodate the projected 2035 design year traffic volumes with an acceptable level of service.

The total estimate for the preferred Alternative 4, a six-lane divided superstreet shoulder section, with 12-foot travel lanes, a 30-foot raised grass median, and 8-foot shoulders (4 feet of which are paved) on 200 feet of right of way and the extensions of Culvert No. 61 and Culvert No. 62 is \$34,500,000.



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
PROGRAM DEVELOPMENT BRANCH

FS-0811B

US 421

FROM SR 1226 (WESTGATE DRIVE) TO THE YADKIN RIVER

WILKES COUNTY

DIVISION 11

FIGURE 1